THE REEVALUATION OF THE GENUS CLIOCOCCA (LINACEAE) OF SOUTH AMERICA

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During the course of preparing a revision of *Linum* in South America, it has become necessary to review the position of the aberrant species *L. selaginoides* Lam. in the genus. It is very different from other South American species; study of the North American flaxes (Rogers 1963, 1968) and examination of the Old World species at Kew (K), Paris (P) and Geneva (G) reveal that it is equally distinct from other species of the genus (Fig. 1).

Few of these differences are revealed in Lamarck's original description of the species as *L. selaginoides* (1791). Babington (1842), however, noted several of its peculiarities when he established the genus *Cliococca* for it. The material upon which he based his description came from plants grown in the Cambridge Botanical Garden from seed he thought had been collected in New South Wales by a "Mr. Melluish, whilst accompanying a party in pursuit of bushmen." There are no plants resembling this species from that region, and it is clear from both his text and accompanying illustrations that it was the South American plant that he had before him.

Planchon (1848) retained the species in the genus *Linum*, establishing the subgenus *Cliococca* for it, a disposition which has been continued since.

The authors have now had the opportunity to examine about two hundred collections of this species, to observe it in the field and to grow plants to maturity in the greenhouse. It is evident that it differs from *Linum* in a number of important characteristics and that it is probably only distantly related to any species of that genus. Although *Linum*, a genus of about 150 species, shows a substantial amount of variation, there are numerous intermediates which tend to tie the species into a clearly related whole. This is not

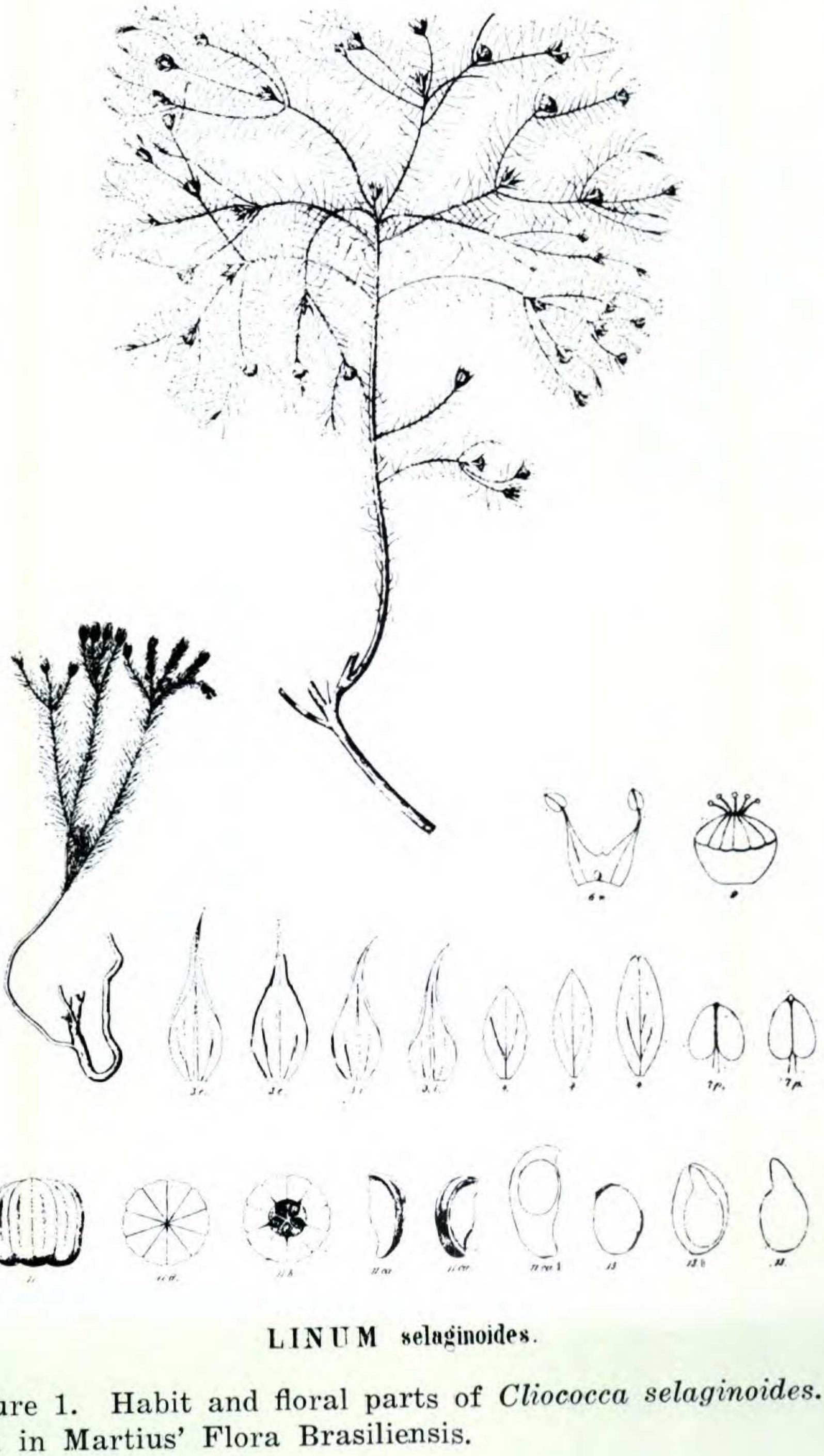

Figure 1. Habit and floral parts of *Cliococca selaginoides*. From Urban in Martius' Flora Brasiliensis.

the case with *L. selaginoides*, which stands well apart. Its segregation into another genus properly reflects this and it is therefore proposed to resurrect the genus *Cliococca*. In the following description, the features which generally distinguish it from *Linum* are italicized. Some of these are amplified in the discussion which follows.

Cliococca Babington, Trans. of the Linn. Soc. of Lond. **19**: 33. 1842. Perennial, glabrous herb, 9-25 (5-38) cm tall, simple or branched at the base and in the inflorescence, the often decumbent, *very leafy stems arising from an extensive, branched, underground rootstock;* leaves alternate, imbricate, 1-nerved, linear, the larger 6.0-9.6 (5-11) mm long, 0.4-0.6 (0.2-0.7) mm wide, spreading; stipular glands none; *flowers few, terminal on stems or branches*; sepals five, lanceolate, 3 to 5-nerved, margins entire, the outer larger, these 4.8-5.4 (4-6) mm long; petals five, *imbricate*, oblanceolate with a short claw, *whitish or tinged with pale pink*, 2.3-3.2 mm long, *shorter than the sepals*; stamens five, ca 2 mm long, united at the base, with small, deltoid intervening staminodia or these sometimes absent; anthers ovate-cordate, ca 0.5 mm long; styles five, separate, *ca 0.4-0.9 mm long*; stigmas capitate; fruits broadly obovate, flattened at the summit, 2.9-3.5 (2.5-3.7) mm high, 3.2-3.7 (2.9-3.9) mm in diameter, outer walls thick; *false septa complete, the fruit ultimately separating into* 10 *indehiscent* 1-*seeded segments*; seeds light brown, elliptic, ca 1.7 mm long, 1.0 mm wide; pollen tricolpate; chromosome number, $n = 18$ (Darlington and Wylie, 1955).

Although there are sufficient resemblances between *Cliococca* and *Linum* that the latter must be considered the most closely related genus, it is not clear with what portion of *Linum* its affinities lie. The extensive underground rootstocks are apparently unknown in *Linum*. Except for a juvenile plant or two, none of the herbarium specimens of *Cliococca* examined had complete rootstocks, although some were several inches in length and possessed a number of aerial stems. It is likely that colonies of considerable extent

may very well result from this kind of vegetative reproduction. Plants grown in the greenhouse seem to be facultative apomicts; if so, asexual reproduction may be accomplished by seeds as well. In nearly all species of *Linum* the inflorescence is a paniculate or racemose cyme; only *L. imbricatum* and *L. hudsonioides*, two North American species not very closely related to *Cliococca*, have inflorescences resembling it. The manner in which the false septa are completely developed, resulting in the fruit separating into ten indehiscent segments is unknown in *Linum*, except, possibly, in the otherwise very different African *L. kenicnse*. The very short styles and the petal color and size are different from species of *Linum*; corollas in *Linum* are uniformly convolvulate while in *Cliococca* they are imbricate. The pollen is also quite different. Xavier (1967) in a worldwide survey of the genus, divided the pollen of *Linum* into sixteen types. That of *L. selaginoides* constituted one type, and he stated that its unique pollen morphology would support placing the species in a separate genus. When these several characters are considered, it is clear that the plant is most properly removed from *Linum*.

There is but a single species, widespread and sometimes weedy, in a variety of habitats in south-central South America (Fig. 2).

Placing this species in the genus *Cliococca* requires the following new combination:

Cliococca selaginoides (Lam.) Rogers and Mildner, **comb. nov.** Type: Uruguay: Montevideo, *Commerson* (P!)

Linum selaginoides Lam. Encycl. 3: 525. 1791.

Cliococca tenuifolia Bab., Trans. Linn. Soc. Lond. 19: 34. Tab. III. 1842.

Linum babingtonii Planch., Lond. Jour. Bot. 7: 179. 1848. Based on *C. tenuifolia* Bab.

Linum selaginoides Lam. var. *chilense* Planch., Lond. Jour. Bot. 7: 179. 1848. Type: Chile: Valdivia, *Bridges* 669 (K!).

Linum mycrophyllium Larr., Escritos Larrañaga 2: 122. 1923. Based on *L. selaginoides* Lam.

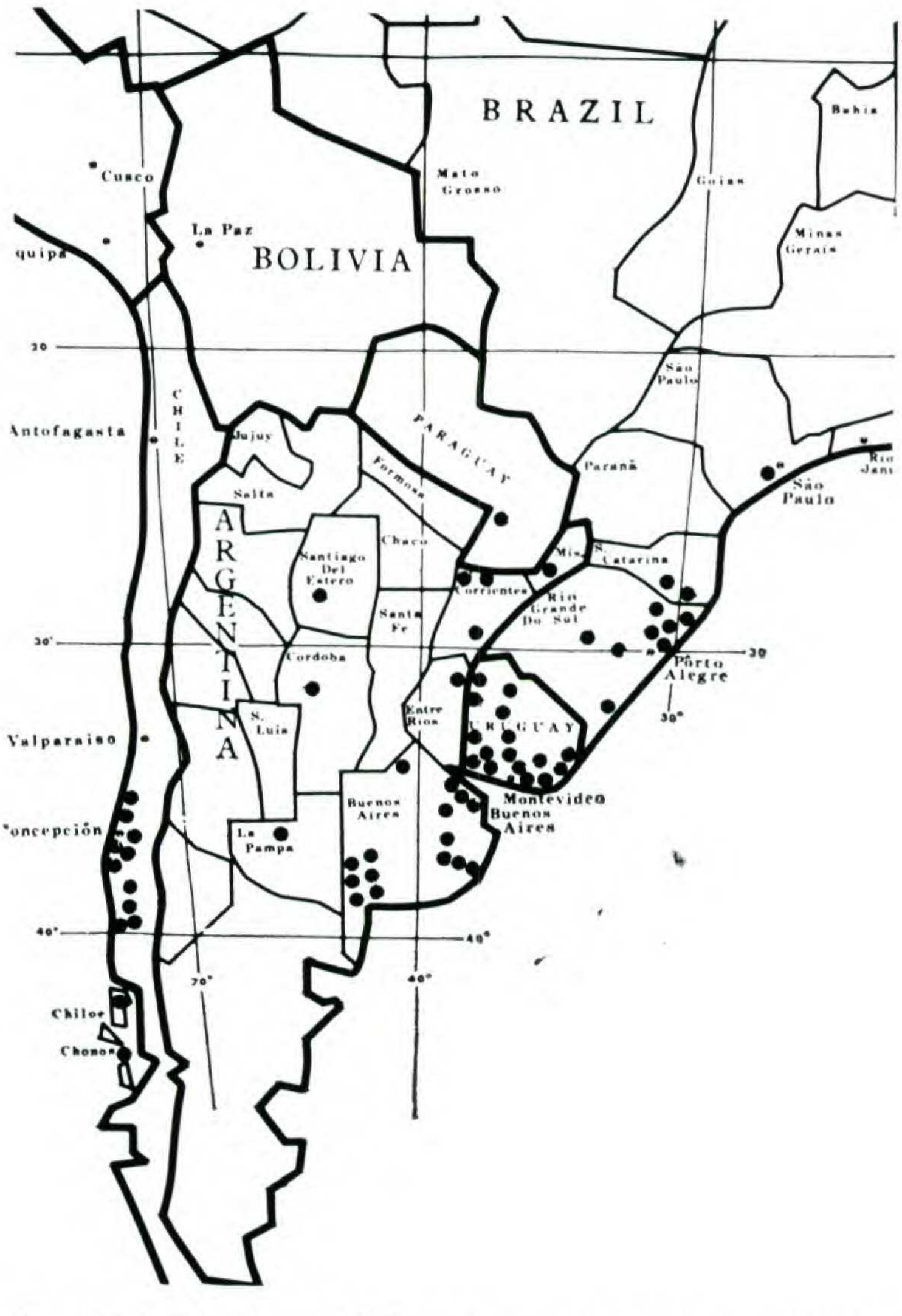

Figure 2. Distribution of *Cliococca selaginoides* in South America. The location in Paraguay is only approximate.

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